

**INTERCONNECT STRUCTURES INCORPORATING LOW-k
DIELECTRIC BARRIER FILMS**

ABSTRACT OF THE DISCLOSURE

[0052] The present invention comprises an interconnect structure including a metal, interlayer dielectric and a ceramic diffusion barrier formed therebetween, where the ceramic diffusion barrier has a composition $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$, where $0.1 \leq v \leq 0.9$, $0 \leq w \leq 0.5$, $0.01 \leq x \leq 0.9$, $0 \leq y \leq 0.7$, $0.01 \leq z \leq 0.8$ for $v + w + x + y + z = 1$. The ceramic diffusion barrier acts as a diffusion barrier to metals, i.e., copper. The present invention also comprises a method for forming the inventive ceramic diffusion barrier including the steps depositing a polymeric preceramic having a composition $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$, where $0.1 < v < 0.8$, $0 < w < 0.8$, $0.05 < x < 0.8$, $0 < y < 0.3$, $0.05 < z < 0.8$ for $v + w + x + y + z = 1$ and then converting the polymeric preceramic layer into a ceramic diffusion barrier by thermal methods.